

TAXONOMIC MONOGRAPH ON ASTERACEAE OF MAHARASHTRA STATE

**A THESIS SUBMITTED
TO THE
UNIVERSITY OF MUMBAI
FOR THE
Ph. D. (Science) DEGREE
IN BOTANY**

**SUBMITTED BY
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**UNDER THE GUIDANCE OF
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NOVEMBER 2016

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Submitted by

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Reg. no. 39, 09 April 2008

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3.3 : KEY TO TRIBES

1. Heads homogamous; florets all ligulate or tubular or tubuliform.....2
1. Heads heterogamous; florets both ray and disk.....13
2. Flowers all ligulate.....**Cichorieae**
2. Flowers all tubular.....3
3. Corolla of disc florets bilabiate with 2 adaxial lobes and 3 lobed abaxial limb...**Mutisieae**
3. Corolla of disc florets radially symmetrical, not bilabiate.....4
4. Anthers almost calcarate, apical appendage not demarcated from the connective and flat, style hairs scattered on the branches much below the shaft.....5
4. Anthers almost ecalcarate, apical appendages often demarcated from the connective and concave, style hairs restricted to upper portion of branch and very often concentrated at the apices of branches rarely on the shaft below the branches.....6
5. Leaves mostly unarmed very rarely spiny, phyllaries neither scarious appendaged nor spiny tipped.....**Vernonieae**
5. Leaves mostly spiny or spinulose, phyllaries mostly scarious or spiny tipped.....**Cardueae**
6. Receptacle palaceous.....7
6. Receptacle epalaceous8
7. Style asteroid type i.e. the stigmatic portion prolonged into triangular to lanceolate to subulate sterile appendages.....**Astereae**
7. Style not as above.....**Heliantheae**
8. Leaves opposite.....**Eupatorieae**
8. Leaves alternate.....9
9. Style asteroid type i.e. stigmatic portion prolonged into triangular to lanceolate to subulate sterile appendages..**Astereae (p.p.)**
9. Style not as above.....10
10. Stigmatic areas always confluent apically.....**Inuleae**
10. Stigmatic areas always in two separate lines or partially or wholly continuous ventrally but not confluent apically.....11
11. Filament collar slender or often much dilated with swollen cells, phyllaries mostly in

one row rarely in 2-rows, wholly herbaceous.....	<i>Senecioneae</i>
11. Filament collar not as above, phyllaries in several rows, rarely in two rows, either fully scarious or at least with the scarious margin and apex.....	12
12. Anthers tailed.....	<i>Inuleae (p.p.)</i>
12. Anthers not tailed.....	<i>Anthemideae</i>
13. Anthers distinctly tailed.....	14
13. Anthers not tailed, sometimes mucronate at base.....	16
14. Anther tips without distinct hyaline appendage.....	<i>Multiseae (p.p.)</i>
14. Anther tips with distinct hyaline appendage.....	15
15. Style branches linear, obtuse, non-appendiculate.....	<i>Inuleae (p.p.)</i>
15. Style branches of hermaphrodite florets, truncate or appendiculate.....	<i>Senecioneae (p.p.)</i>
16. Involucral bracts with scarious or hyaline margins and tips.....	17
16. Involucral bracts not as above.....	18
17. Receptacle epaleaceous. Pappus hairs capillary.....	<i>Astereae (p.p.)</i>
17. Receptacle paleaceous. Pappus of scales and palea or absent.....	<i>Anthemideae (p.p.)</i>
18. Involucral bracts uniseriate, valvate, connate nearly to apex.....	<i>Tageteae</i>
18. Involucral bracts 1-many seriate, not connate as above.....	19
19. Pappus of white, copius, capillary, paleaceous hairs.....	<i>Senecioneae (p.p.)</i>
19. Pappus of paleas, bristles or awns, rarely absent.....	<i>Heliantheae (p.p.)</i>

Undershubs, erect, glabrous, ca 90 cm high; rootstock woody; branches striate, terete. Leaves subsessile, ovate or elliptic, apex obtuse or subacute, entire, base narrowed to very obscure petiole, coriaceous, glabrous. Heads in large, terminal, globose clusters, 2.5-3.5 cm in diam., 5-10 flowered, with broad leafy bracts at base; involucre bracts 1-2 seriate; outer herbaceous, flat or slightly concave, keeled on back, each with a single female floret; inner bracts slightly larger than outer ones. Ray florets 2 in each head, ligules short and conspicuous, yellowish-white. Disc florets 3-8 in each head. Achenes black, ca 3 mm long, distinctly 3-angled, strongly ciliate on the angles; those of disc florets smaller, up to 2 mm long. Pappus of few short hairs, unequal.

Fl. & Fr.: August – December

Type : India, Wight, Robert, 1418 (Isolectotype : E)

Illustration : Wight, Ic. t. 1093. 1846

Distribution : Endemic to India.

Occurrence & Habitat : Rare; on crest of Ghats on hill slopes in Pune district.

Specimen examined : Maharashtra, Pune, Katraj, 29/09/55, V.D.Vartak 1257; Katraj, 29/08/58, V.D.Vartak 13631(AHMA); Katraj – Sinhagad Forest Rd., 13/12/63, M.Y.Ansari 88008(BSI).

Blumea DC., Arch. Bot. (Paris) 2: 514, 1833. (*nom. cons.*)

Type: *Blumea balsamifera* (L.) DC., Prodr. 5: 447, 1836. (*Conyza balsamifera* L.) *typ. cons.*

Herbs or undershrubs, usually aromatic. stems simple or branched, not winged, glabrate or variously pubescent. Leaves alternate, simple, linear-lanceolate, oblong, ovate, obovate or oblanceolate, sessile or shortly petiolate, entire or pinnately or lyrate lobed, apiculate or acute, serrate, dentate or denticulate, generally pubescent on both surfaces. Heads heterogamous, disciform, solitary axillary or terminal, arranged in lax to compact panicles, few to many, sessile or pedunculate. Involucre bracts multiseriate; outer ones usually linear, sometimes oblong to ovate, herbaceous, smaller; inner ones linear-oblong, hairy or pubescent, with scarious margins; receptacle naked or epaleaceous, flat, convex or

rarely concave, glabrous or pilose or densely pubescent. Florets numerous, multiseriate; outer ones female; inner ones usually bisexual. Corolla of inner florets mostly yellow, sometimes pinkish or purple; tubular, 5-lobed; lobes angular, papillate, glabrous or pubescent on lobes, rarely pubescent on tube; corolla of outer florets usually filiform, slender, 2-4 lobed, generally glabrous, sometimes pubescent. Anthers tailed. Achenes brown, oblong, angular or ribbed, glabrous or pubescent. Pappus white, yellowish or red, uniseriate, with numerous, slender hairs.

Africa, tropical Asia, Australia, Pacific islands; ca 50 species; 32 species and 5 var. in India; 21 species and 3 var. in Maharashtra.

Key to species

1. Leaves decurrent, forming wings on stem.....*B. venkataramanii*
1. Leaves not forming wings on stem.....2
2. Plants densely white-woolly all over.....3
2. Plants glabrate or variously pubescent but never woolly all over.....5
3. Leaves spiny toothed; female florets densely pubescent.....*B. malcolmii*
3. Leaves not spiny toothed; female florets glabrous.....4
4. Heads compact-globose in spicate panicles.....*B. hieracifolia*
4. Heads in lax panicles.....*B. lacera*
5. Outer involucral bracts oblong-ovate to oblong-lanceolate.....6
5. All involucral bracts linear-lanceolate.....8
6. Leaves pubescent on upper surface.....*B. clarkei*
6. Leaves glabrous on upper surface.....7
7. Erect; receptacle fimbriate; female florets glabrous or nearly so.....*B. lanceolaria*
7. Scandent; receptacle densely pubescent; female florets hairy on lobes.....*B. riparia*
8. Pappus reddish.....*B. balsamifera*
8. Pappus white.....9
9. Corolla lobes of bisexual florets with multicellular hairs in addition with collectors....10
9. Corolla lobes of bisexual florets glabrous or with multicellular hairs in addition with collectors.....11
10. Leaves acute, remotely denticulate.....*B. bovei*

10. Leaves apiculate, serrate-dentate.....	<i>B. obliqua</i>
11. Heads solitary axillary or terminal; upper leaves distinctly subopposite.....	<i>B. bifoliata</i>
11. Heads glomerulate or variously paniculate; all leaves alternate.....	12
12. Heads glomerulate; the clusters interruptly spicate.....	13
12. Heads paniculate.....	14
13. Receptacle glabrous.....	<i>B. sessiliflora</i>
13. Receptacle pubescent.....	<i>B. fistulosa</i>
14. Leaves spiny toothed; corolla hairy.....	15
14. Leaves not spiny toothed; corolla of female florets glabrous.....	17
15. Heads in sessile axillary clusters.....	<i>B. belangeriana</i>
15. Heads in pedunculate clusters.....	16
16. Prostrate herbs.....	<i>B. oxydonta</i>
16. Erect herbs.....	<i>B. eriantha</i>
17. Receptacle minutely pilose.....	<i>B. sinuata</i>
17. Receptacle glabrous.....	18
18. Achenes ribbed.....	19
18. Achenes subangular, terete, not ribbed.....	<i>B. axillaris</i>
19. Plant glabrous.....	<i>B. virens</i>
19. Plants pilose or glandular- pubescent.....	20
20. Stem pilose in young parts.....	<i>B. paniculata</i>
20. Stem glandular-pubescent.....	<i>B. atropurpurea</i>

Blumea atropurpurea Haines, Bot. Bihar & Orissa 2: 492, 1961 (Repr.); Rao *et al.*, Fl. Ind. Enum. Aster. 14, 1988; Naik & Bhogaonkar in *J. Econ. Tax. Bot.* 14: 732, 1990; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 203, 2009; Singh *et al.*, Fl. Maharashtra State 2:186, 2001.

Herbs, erect, up to 60 cm tall; stems striate, purple, glandular-pubescent. Leaves simple, obovate, oblanceolate, entire or dentate towards apical half, finely pubescent with sessile glands, shortly sparsely hairy above. Heads pink-purple, arranged in short, terminal bracteate cymes on long peduncles; outer bracts with purple margin.

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spinose-tipped; inner green ciliate; receptacle glabrous. Corolla lobes with sessile glands.
Achenes minutely pubescent, ribbed.

Fl. & Fr.: December – January

Type : India, Haines, H.H., 4609, (K), K000978500 (Type designated here)

Distribution : Endemic to India.

Occurrence & Habitat : Rare; along river banks and around fields in Amravati.

Note : This species has been reported here on the authority of Naik & Bhogaonkar from Amravati. Randeria (1960) in taxonomic revision of *Blumea* treated this species in taxa and names of uncertain status.

Blumea balsamifera (Linn.) DC., Prodr. 5: 466, 1836; Clarke, Comp. Ind. 89, 1876; Hook. f., Fl. Brit. Ind. 3: 270, 1881; Randeria in *Blumea* 10(1): 237, 1960; S. Kumar in Hajra *et al.*, Fl. India 13: 118, 1995; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 204, 2009; Almeida, Fl. Maharashtra 3A: 77, 2001.

Conyza balsamifera Linn., *Sp. Pl. ed. 2*, 2: 1208, 1763.

Shrubs or undershrubs, perennial; stems woody, greyish, tomentose, corymbosely branched above. Leaves simple, alternate, elliptic or oblong-lanceolate, base tapering, apex acute to apiculate, entire or pinnatifid, usually silky on dorsal surface. Heads 6-8 mm across, sessile or peduncled in axillary or terminal lax panicles; involucre bracts linear, acute, densely wooly on dorsal surface; receptacle 2-4 mm across, slightly convex, glabrous. Corolla of bisexual florets yellow, tubular, 5-lobed; lobes acute, pubescent. Corolla of female florets filiform, 2-4 lobed, glabrous. Achenes brown, oblong, 10-ribbed, silky. Pappus 4-6 mm long.

Fl. & Fr.: September – November

Lectotype : Herb. Linn. No. 993.18 (LINN)

Distribution : India, Bangladesh, Nepal, Pakistan, China, S.E. Asia and Philippines.

Occurrence & Habitat : Infrequent; at mountain slopes.

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Note : This species has been reported here on the authority of M.R.Almeida, who reports it from Amboli without any collection.

Blumea belangeriana DC., Prodr. 5: 444, 1836; Hook. f., Fl. Brit. India 3: 266, 1881; Cooke, Fl. Pres. Bombay 2: 78, 1958 (Repr.); Randeria in *Blumea* 10: 277, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 15, 1988; S. Kumar in Hajra *et al.*, Fl. India 13: 119, 1995; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 204, 2009; Singh *et al.*, Fl. Maharashtra State 2:187, 2001; Almeida, Fl. Maharashtra 3A: 77, 2001. (Photo Plate 2,10)

Herbs, erect, up to 40 cm high; stem terete, much branched, reddish-brown, glabrate at base, densely glandular hairy at apex. Leaves obovate, abruptly tapering at base, apiculate, 4-8 x 2-4 cm, hairy on both sides, margins serrate-dentate, sessile or subsessile. Heads 0.5-0.6 cm across, sessile, in dense axillary and terminal leafy clusters; involucre bracts lanceolate, acute, purple tipped, reflexed at maturity, more or less scarious, hairy on dorsal surface, ciliate on the margins; receptacle convex, glabrous. Corolla of bisexual florets, yellow, tubular, 4-5 mm long, 5-lobed; lobes pubescent. Female florets few; corolla filiform, 3-4 mm long, 2-3 lobed, lobes hairy. Achenes pale brown, terete, oblong, pubescent. Pappus white -4 mm long.

Fl. & Fr.: December – May

Type : India, Belanger, C. P., 1009, (GDC), G00457526

Distribution : Endemic to west coast of Peninsular India

Occurrence & Habitat : Occasional; on hills in Konkan, crest of Ghats and in Vidarbha as undergrowth in forests margins.

Specimen examined : Maharashtra, Pune, Sinhagad, 12/02/56, V.D.Vartak 3158 (AHMA); Khandala, Battery hill, 07/03/62, S.R.Rolla 69729; Palghar, Chahad khind, 15/01/68, K.V.Billore 113568; Raigad, Matheran - Neral Rd., 02/02/57, G.S.Puri 14109; Chandrapur dist., Vasant Bhandara, 04/03/71, B.M.Wadhwa 133703 (BSI).

Exsiccata : Maharashtra, Raigad, Matheran, 17/12/2010, Rajdeo Singh, RAJ 551; Mumbai, Gorai, 18/12/2010, Rajdeo Singh, RAJ 593; Amravati, Melghat, 21/1/2011, Rajdeo Singh, RAJ 799; Pune, Bhimashankar, 6/11/2011, Rajdeo Singh, RAJ 1008.

Blumea bifoliata (Linn.) DC. in Wight, Contrib. 14, 1834; Hook. f., Fl. Brit. India 3: 261, 1881; Cooke, Fl. Pres. Bombay 2: 75, 1958 (Repr.); Randeria in *Blumea* 10: 288, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 15, 1988; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 204, 2009; Singh *et al.*, Fl. Maharashtra State 2: 187, 2001; Almeida, Fl. Maharashtra 3A: 77, 2001.

Conyza bifoliata Linn., Sp. Pl. ed. 2. 1207, 1753. (Photo Plate 10)

Herbs, viscid, erect or decumbent, pubescent, clothed with spreading hairs, upto 40 cm tall. Leaves 2-4 x 0.5-1.0 cm, oblong - spatulate to oblanceolate, membranous, softly pubescent above and below, glandular; lower leaves cuneate, decurrent to petiole, upper ones truncate, acute, dentate. Heads 1.0 - 1.2 cm across, terminal and axillary, solitary, yellow, pedunculate; outer involucre bracts lanceolate, acuminate, densely strigose; inner ones linear-lanceolate, scarious, hairy, glandular. Corolla of bisexual florets tubular, 5-lobed; lobes hairy; corolla of female florets filiform, 2-3 lobed, glabrous. Achenes oblong with 4-5 hairy angles, pubescent, smooth. Pappus white, 2-4mm long.

Fl. & Fr.: November – February

Lectotype : "*Eupatoria Conyzoides, integro Jacobaeae folio molli & incano*" in Plukenet, Phytographia, t. 177, f. 1, 1692; India.

Distribution : India, Pakistan, Myanmar and Sri Lanka

Occurrence & Habitat : Infrequent, on east of Ghats, in damp places in forests, grasslands & dried fields.

Specimen examined : Maharashtra, Parbhani, Agri. Univ. Campus, 12/01/84, Mahadev 6321; Nanded, Mirzapur, 28/02/85, Madhukar 7080; Osmanabad, Bawi, 12/02/67, V.N.Naik 1342; Sahstrakunda, 06/01/70, V.N.Naik 675 (BAMU); Nagpur, Agri. field behind the Maharajbag, 4/2/1961, U.Pirashi 753 (BLAT); Nagpur College premises, 03/03/63, S.A.Paradkar 37(BSI).

Exsiccata : Maharashtra, Nanded, Dec. 2013, Rajdeo Singh, RAJ 1425.

Blumea bovei (DC.) Vatke in *Linnaea* 39: 486, 1875; Randeria in *Blumea* 10: 285, 1960; S. Kumar in Hajra *et al.*, Fl. Ind. 13: 120, 1995; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 204, 2009; Almeida, Fl. Maharashtra 1A: 77, 2001.

Comiza bovei DC. in Ann. Sci. Nat. Bot. Ser. 2, 1: 261, 1814.

Herbs, up to 40 cm tall; stem terete, branched at the base, glabrous or sparsely pubescent. Leaves alternate; cauline leaves linear-oblong, auriculate at base, apiculate, remotely denticulate, 1.5-4 x 0.3-0.6 cm, glabrous or sparsely pubescent on both surfaces, sessile. Heads axillary and terminal, solitary or in lax corymbs, 6-8 mm across, involucre bracts 3-4 seriate, herbaceous, linear-lanceolate, acute, 4-6 mm long; outer ones pubescent; receptacle flat, areolate, glabrous. Corolla of bisexual florets yellow, tubular, 5-lobed; lobes pubescent; corolla of female florets filiform, 2-3 lobed, glabrous. Achenes brown, oblong, 0.5-0.7 mm long, pubescent. Pappus white, 3-4 mm long.

Fl. & Fr.: February – April

Type: Egypt, Sinai, Bové, N., 118, (GDC), G00453733

Distribution: N. E. and Western Africa, Southern Iran and Pakistan.

Occurrence & Habitat: Infrequent; in wet areas.

Note: This species has been reported on the authority of M.R.Almeida from Mumbra without any collection.

Blumea clarkei Hook. f., Fl. Brit. India 3: 267, 1881; Randeria in *Blumea* 10: 252, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 15, 1988; S. Kumar in Hajra *et al.*, Fl. India 13: 121, 1995; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 204, 2009; Singh *et al.*, Fl. Maharashtra State 2:187, 2001.

Blumea malabarica Hook. f., op. cit.; Cooke, Fl. Pres. Bombay 2: 79, 1958 (Repr.).

Blumea hirsuta (Less.) Almeida, Fl. Maharashtra 3A: 79, 2001.

Herbs, more or less pubescent, up to 1 m high; stems unbranched, erect with terete branches. Leaves obovate or oblanceolate, acute, subsessile, distantly serrate, more or less pubescent on both surfaces. Heads in small, axillary clusters, 1 cm across; involucre

Blumea bovei (DC.) Vatke in *Linnaea* 39: 486, 1875; Randeria in *Blumea* 10: 285, 1960; S. Kumar in Hajra *et al.*, Fl. Ind. 13: 120, 1995; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 204, 2009; Almeida, Fl. Maharashtra 3A: 77, 2001.

Conyza bovei DC. in Ann. Sci. Nat. Bot. Ser. 2, 1: 261, 1834.

Herbs, up to 40 cm tall; stem terete, branched at the base, glabrous or sparsely pubescent. Leaves alternate; cauline leaves linear-oblong, auriculate at base, apiculate, remotely denticulate, 1.5-4 x 0.3-0.6 cm, glabrous or sparsely pubescent on both surfaces, sessile. Heads axillary and terminal, solitary or in lax corymbs, 6-8 mm across; involucre bracts 3-4 seriate, herbaceous, linear-lanceolate, acute, 4-6 mm long; outer ones pubescent; receptacle flat, areolate, glabrous. Corolla of bisexual florets yellow, tubular, 5-lobed; lobes pubescent; corolla of female florets filiform, 2-3 lobed, glabrous. Achenes brown, oblong, 0.5-0.7 mm long, pubescent. Pappus white, 3-4 mm long.

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Occurrence & Habitat : Infrequent; in wet areas.

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Blumea malabarica Hook. f., op. cit.; Cooke, Fl. Pres. Bombay 2: 79, 1958 (Repr.).

Blumea hirsuta (Less.) Almeida, Fl. Maharashtra 3A: 79, 2001.

Herbs, more or less pubescent, up to 1 m high; stems unbranched, erect with terete branches. Leaves obovate or oblanceolate, acute, subsessile, distantly serrate, more or less pubescent on both surfaces. Heads in small, axillary clusters, 1 cm across; involucre

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bracts linear, acute, pubescent; outer ones lanceolate; inner linear-lanceolate, acute, more or less scarious with ciliate apices and margins; receptacle 4-5 mm across, densely pilose. Corolla of bisexual florets yellow, tubular, 5-lobed; lobes acute, pubescent; corolla of female florets filiform, 2-3 lobed. Achenes pale brown, oblong, ribbed, 1-2 mm long, oblong, sparsely pubescent. Pappus white, 5-6 mm long.

Fl. & Fr.: November – February

Type : Sikkim Himalaya, Clarke, C.B., 27069 (K).

Distribution : Indonesia, Malaysia, Myanmar, Philippines, Thailand, Vietnam

Occurrence & Habitat : Rare; growing on hill slopes.

Note : This species has been reported on the authority of Stocks from Konkan.

Blumea eriantha DC., Wight, Contrib. Bot. Ind. 15, 1834; Hook. f., Fl. Brit. India 3: 266, 1881; Cooke, Fl. Pres. Bombay 2: 78, 1958 (Repr.); Randeria in *Blumea* 10: 279, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 15, 1988; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 204, 2009; Singh *et al.*, Fl. Maharashtra State 2:188, 2001; Almeida, Fl. Maharashtra 3A: 78, 2001.

'Buradi, Nimurdi'

Herbs, erect, perennial, up to 1 m high; stems reddish-yellow, dichotomously, branched, clothed with long, white, silky hairs, glandular. Leaves alternate, sessile or subsessile, 2.0-7.5 x 1-4 cm; lower leaves obovate, base tapering, apiculate or obtuse, margins irregularly spinulose-serrate, subsessile; upper leaves elliptic - oblong, margins spinulose-serrate, densely pilose on both surfaces when young, scabrid with age, sessile. Heads axillary or terminal, solitary or few clustered, 5-6 mm across, yellow; involucre bracts linear, herbaceous, slightly longer than florets, completely reflexed at maturity, glandular pubescent, margins scarious, ciliate; receptacle glabrous. Corolla of central florets yellow, tubular, 3-4 mm long, 5 lobed, pubescent on lobes and tube; corolla of marginal female florets 3-4 mm long, 2-3 lobed, pubescent. Achenes brown, minutely hairy, obscurely angled. Pappus white, longer than achenes.

Fl. & Fr.: December – April

Type : India, Wight, Robert, 1435/27, (Isotype : E), E00413663

Distribution : Endemic to India.

Occurrence & Habitat : Common; throughout in open forests and cultivated fields.

Specimen examined : Maharashtra, Bombay, Sion, 11/1916, *E. Blatter* 14445; Ratnagiri Dist., Khed, Jan. 1922, *R.D.Acland*, ACK 566; Khandala, St. Xavier's Ravine, 16/4/56, *H.Santapau* 20362; Mahabaleshwar, Chinaman's falls, 27/12/57, *Y.A.Merchant* 493 (BLAT); Solapur dist., Wangi No.2, 27/02/2002, *S.K.Das Das* 179640; Ratnagiri, Ghotge, 10/02/66, *M.Y.Ansari* 107670; Satara, Bamnoli, 20/01/84, *S.D.Deshpande* 166650; Khed, Kondeshwar hill base, 25/01/61, *K.P.Janardharan* 66475 (BSI).

Exsiccata : Maharashtra, Mumbai, Sanjay Gandhi National Park, 1/10/2010, *Rajdeo Singh*, RAJ 387; Nashik, 1/12/2010, *Rajdeo Singh*, RAJ 467; Pune, Bhimashankar, 9/1/2011, *Rajdeo Singh*, RAJ 643.

Blumea fistulosa (Roxb.) Kurz, *J. Asiat. Soc. Bengal* 46 (2): 187, 1877; Randeria in *Blumea* 10: 256, 1960; Bole and Almeida, *JBNHS* 79:597, 1983; Rao *et al.*, *Fl. Ind. Enum. Aster.* 15, 1988; S. Kumar in Hajra *et al.*, *Fl. India* 13: 124, 1995; Karthikeyan *et al.*, *Flowering plants of India, Dicotyledons* 1: 204, 2009; Singh *et al.*, *Fl. Maharashtra State* 2: 188, 2001; Almeida, *Fl. Maharashtra* 3A: 78, 2001.

Conyza fistulosa Roxb., *Fl. Ind.* 3: 429, 1832.

Blumea glomerata DC. in Wight, *Contrib.* 15, 1834; Hook. f., *Fl. Brit. India* 3: 262, 1881; Cooke, *Fl. Pres. Bombay* 2:76, 1958 (Repr.). (Photo Plate 11)

'*Bhamburda*'

Herbs, up to 1 m high; stem and branches ashy pubescent, glabrate at base. Lower leaves obovate with a long tapering base, serrate or lyrate-pinnatifid, shortly petioled; upper leaves smaller, oblong-lanceolate to broadly oblanceolate, acute to apiculate, sessile, serrate – dentate, pubescent on both surfaces. Heads 4-6 mm across, yellow, in compact globose clusters, often in interrupted spicate panicles; involucral bracts purple, slightly longer than the florets; inner linear with scarious margins, acute, minutely pubescent on

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dorsal surface with glandular hairs; receptacle flat or slightly concave, pubescent. Corolla of bisexual florets yellow, tubular, 3-4 mm long, 5 lobed with papillate pubescent lobes; corolla of female florets filiform, 2-3 lobed, glabrous. Achenes brown, oblong, quadrangular, ribbed, sparingly hairy. Pappus white, up to 4 mm long.

Fl. & Fr.: December – February

Type : India, Roxburgh *s.n.* (K, type drawing)

Distribution : Endemic to India.

Occurrence & Habitat : Occasional; as forest undergrowth in Thane and Vidarbha.

Specimen examined : Maharashtra, Nanded, Sitakhandi, ?, *W. Khan* 640, 1476 (BAMU); Thana forest, North Konkan, Feb. 1918, *T.R.D. Bell*, 3774 (BLAT)

Exsiccata : Maharashtra, Yavatmal, Painganga, 27/1/2011, *Rajdeo Singh*, RAJ 776; Akola, Gullar ghat, 30/1/2011, *Rajdeo Singh*, RAJ 718; Chandrapur, 25/1/2012, *Rajdeo Singh*, RAJ 1247.

Note : Cooke includes this species from Konkan on the authority of Dalz. & Gibs., whose specimen he has not seen. Randeria, Bole and Almeida includes on the authority of T.R.D. Bell, who collected it from Thana forest.

Blumea hieracifolia (D. Don) DC., Wight, Contrib. Bot. Ind. 15, 1834; Randeria in *Blumea* 10: 246, 1960; S. Kumar in Hajra *et al.*, Fl. India 13: 125, 1995; Almeida, Fl. Maharashtra 3A: 78, 2001; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 204, 2009.

Erigeron hieracifolium D. Don, Prodr. Fl. Nepal. 272, 1825.

Blumea sericans Hook. f., Fl. Brit. India 3: 262, 1881.

Key to varieties

- Heads in pedunculate clusters.....var. *macrostachya*
Heads in sessile clusters.....var. *hieracifolia*

var. *hieracifolia*

Herbs, erect, silky villous, up to 1.5 m tall; stems unbranched or branched, tomentose. Lower leaves crowded at base, obovate-spathulate, acute or obtuse, margins obscurely dentate-serrate, 2-20 x 0.3-0.6 cm, velutinous on upper surface, densely woolly on lower surface. Heads globose, in axillary and terminal sessile clusters forming a dense panicle or interrupted-spicate inflorescence; involucre bracts purple tipped, oblong-lanceolate, acuminate, reflexed at maturity; receptacle slightly convex, alveolate, glabrous. Corolla of bisexual florets tubular, 5-lobed; lobes triangular, pubescent; corolla of female florets filiform, 3-4-lobed, glabrous. Achenes brown, oblong, ribbed, sparsely pubescent. Pappus white, 3-4 mm long.

Fl. & Fr.: December – February

Type : Nepal, Hamilton *s.n.* (BM).

Distribution : India, Pakistan, Burma, Indonesia, China, Nepal, .

Occurrence & Habitat : Occasional; in moist shady places.

Note : M.R.Almeida includes this variety on the authority of Randeria, while Randeria doesn't mentions it from Maharashtra.

var. *macrostachya* (DC.) Hook. f., Fl. Brit. India 3: 263, 1881; Randeria in *Blumea* 10: 248, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 16, 1988; Naik & Bhogaonkar in *J. Econ. Tax. Bot.* 14: 732, 1990; S. Kumar in Hajra *et al.*, Fl. India 13: 126, 1995; Singh *et al.*, Fl. Maharashtra State 2:188, 2001.

Blumea macrostachya DC., Prodr. 5:442, 1836; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 206, 2009.

Herbs, erect or diffuse. Leaves radical and cauline, shortly dentate.serrate. Heads solitary, on slender peduncles or mostly in cymose clusters. Achenes minute, pilose.

Fl. & Fr.: December – February

Type : India, Wallich 3053/143 (K).

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Distribution : India, Burma, Indochina, China and Philippines.

Specimen examined : Maharashtra, Thane dist., Panwel, ?, *P.Y.Bhogaonkar*, PYB 34.

Note : This variety has been reported on the authority of M.R.Almeida, who reports it from Mahabaleshwar without any collection. Naik and Bhogaonkar reports this species from Thane district.

Blumea lacera (Burm. f.) DC., Wight, Contrib. Bot. Ind. 14, 1834; Hook. f., Fl. Brit. India 3: 263, 1881; Cooke, Fl. Pres. Bombay 2:76, 1958 (Repr.); Randeria in *Blumea* 10: 264, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 16, 1988; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 205, 2009; Singh *et al.*, Fl. Maharashtra State 2:189, 2001; Almeida, Fl. Maharashtra 3A: 79, 2001.

Conyza lacera Burm. f., Fl. Ind. 180, t. 59, f. 1. 1768.

Blumea subcapitata DC., Prodr. 5: 439, 1936; Hook. f., op. cit. 261.

Blumea lacera var. *cinerascens* Hook. f., Fl. Brit. India 3: 263, 1881. (Photo Plate 11)

'Burando'

Herbs, aromatic, erect, up to 1 m high; stem branched from base, grooved, densely glandular-pubescent. Leaves 3-8 x 2-5 cm, obovate-oblong, incised or sometimes lyrate-lobed, acute or obtuse, silky pubescent on both sides, margins serrate-dentate, absc. narrowed into a short petiole. Heads 0.4-0.6 cm across, numerous, in axillary and terminal lax panicles; involucre bracts 0.3-0.4 cm long, slightly longer than corolla, linear, acute, glandular hairy; inner bracts with scarious margins; receptacle 2-3 mm across, alveolate, glabrous. Corolla of bisexual florets yellow, tubular, 5-lobed; lobes triangular, pubescent, glandular hairy; corolla of female florets, 2-3-lobed, glabrous. Achenes brown, oblong, sparsely hairy, subangulate, terete. Pappus white, 4 mm long.

Fl. & Fr.: October – March

Type : Java, Burm. f. *s.n.*(G)

Distribution : S.E. Asia, India, China, Nepal, Bhutan, Sri Lanka, Australia and Tropical Africa.

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Occurrence & Habitat : Occasional; on hills in Konkan, crest of Ghats and eastwards in open places and along the edges of forests.

Specimen examined : Maharashtra, Palghar, Parol, Tungar, 29/12/1961, *N.Y.Das*, NYD 5502 (BLAT); Ratnagiri, Kankavli, Sangwe jungle, 12/04/71, *B.G.Kulkarni* 121152; Thane, Ambivli, Khardi Range, 01/06/68, *K.V.Billore* 116105; Ambavne near Mulshi lake, 19/03/63, *S.R.Rolla* 87422 (BSI).

Exsiccata : Maharashtra, Pune, Bhimashankar, 12/9/2009, *Rajdeo Singh*, RAJ 146; Mumbai, Sanjay Gandhi National Park, 9/1/2010, *Rajdeo Singh*, RAJ 201; Aurangabad, Mahismal, 29/12/2012, *Rajdeo Singh*, RAJ 1350.

Blumea laciniata (Roxb.) DC., Prodr. 5:436, 1836; Hook. f., Fl. Brit. India 3: 264, 1881; Cooke, Fl. Pres. Bombay 2:80, 1958 (Repr.); Randeria in *Blumea* 10: 258, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 16, 1988; Singh *et al.*, Fl. Maharashtra State 2:189, 2001.

Conyza laciniata Roxb., Fl. Ind. 3: 428, 1832.

Blumea sinuata (Lour.) Merr., Trans. Amer. Phil. Soc. 24: 388, 1935; Singh in *Bull. Bot. Surv. Ind.* 18: 215, 1979; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 207, 2009; Almeida, Fl. Maharashtra 3A: 84, 2001.

Gnaphalium sinuatum Lour., Fl. Cochinch. 497, 1790. (Photo Plate 11)

Herbs, erect, aromatic, 1 m tall; stems stout with many branches arising from a woody base, covered with dense, glandular pubescence. Lower leaves lyrate lobed, petioled; upper ones obovate, base tapering, apiculate, entire to coarsely dentate, 3-10 x 1-6 cm, pilose on both surfaces, sessile. Heads 0.6-1 cm across, yellow in large, lax terminal panicles; involucre bracts linear-lanceolate, reflexed; outer bracts glandular, hairy on dorsal surfaces; inner lanceolate; receptacle short, flat to slightly convex. Corolla of bisexual florets yellow, tubular, 4-5 mm long, 5-lobed; lobes triangular, pubescent; corolla of female florets filiform, 3-4 mm long, 2-3 lobed, glabrous. Achenes brown, 8-10-ribbed, 1 mm long, sparsely pubescent. Pappus white, up to 4 mm long.

Fl. & Fr.: December – April

Type : India, Roxburgh s.n. (K, type drawing)

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Illustration : S. Kumar in Hajra *et al.*, Fl. India 13: 129, f. 39. 1995.

Distribution : China, Bhutan, India, Indonesia, Malaysia, Myanmar, Nepal, New Guinea, Pakistan, Philippines, Sri Lanka.

Occurrence & Habitat : Occasional; throughout near forests clearing, roadsides and waste places.

Specimen examined : Maharashtra, Beed, Ambejogai, 20/01/84, S.P.Rothe 6258; Beed, Majalgaon, 10/02/84, S.P.Rothe 6415; Nanded, Kandhar, 27/01/84, Madhukar 6372 (BAMU); Nagpur, College of Science premises, 4/2/1961, U.Pirashi 754 (BLAT); Bhari Hill, 25/12/60, K.P.Janardharan 70143; Khed, Andhari, 30/11/61, K.P.Janardharan 76035; Borivali National Park, 12/11/84, B.D.Sharma 167768; Akola, Karla, 18/02/78, S.Y.Kamble 150542 (BSI).

Exsiccata : Maharashtra, Nasik, Dec. 2010, Rajdeo Singh, RAJ 445; Mumbai, Bhandup, 19/3/2011, Rajdeo Singh, RAJ 862.

Notes : Randeria placed *Blumea sinuata* (Lour.) Merr. in a category "Taxa and Names of Uncertain status". M.R.Almeida (2001) and Naik (1998) treated *Blumea laciniata* (Roxb.) DC. as a synonym of *Blumea sinuata* (Lour.) Merr.

Blumea lanceolaria (Roxb.) Druce, Rep. Bot. Exch. Club. Brit. Isles 4: 609, 1917; Randeria in *Blumea* 10: 218, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 17, 1988; S. Kumar in Hajra *et al.*, Fl. India 13: 130, f. 40, 1995; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 205, 2009; Singh *et al.*, Fl. Maharashtra State 2:191, 2001; Almeida, Fl. Maharashtra 3A: 80, 2001.

Conyza lanceolaria Roxb., Fl. Ind. 3: 432, 1832.

Blumea myriocephala DC., Prodr. 5: 445, 1836; Hook. f., Fl. Brit. India 3: 269, 1881.

Key to varieties

Heads 6-8 mm across, subsessile.....var. *lanceolaria*

Heads 9-11 mm across, distinctly pedunculate.....var. *spectabilis*

var. *lanceolaria*

Undershrubs, up to 2 m tall; stem hollow, branched, glabrous or puberulous. Leaves oblanceolate, or narrowly oblong-lanceolate, shortly acuminate, minutely serrate-dentate, upper surface rugose, glabrous, lower surface glabrous or puberulous, many-nerved. Heads 6-8 mm across, clustered in large terminal panicles; involucre bracts green to purplish, longer than florets, recurved and spreading; outer ones ovate-lanceolate; inner narrowly lanceolate with scarious margins, all pubescent on the back, with ciliate margins; receptacle flat, alveolate, densely pilose or rarely glabrate. Corolla of bisexual florets tubular, 5-6 mm long, 5-lobed; lobes acute, glandular-pubescent; corolla of female florets filiform, 5-6 mm long, 2-3 lobed, glabrous. Achenes straw-coloured, oblong, ribbed, pubescent. Pappus yellowish white, up to 5 mm long.

Fl. & Fr.: February – April

Type : India, Roxburgh s.n. (K, type drawing)

Illustration : S. Kumar in Hajra *et al.*, Fl. India 13: 130, f. 40. 1995.

Distribution : China, Bangladesh, India, Myanmar, Sri Lanka and Philippines

Occurrence & Habitat : Infrequent; near wet shady places.

Note : This species has been reported on the authority of M.R.Almeida, who reports it from Purandar and Mahabaleshwar. A.J.Randeria reports this species from Bombay on the authority of Fernandez, while Dalz. reports it from Tullawaree.

var. *spectabilis* (DC.) Randeria in *Blumea* 10: 220, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 17, 1988; S. Kumar in Hajra *et al.*, Fl. India 13: 132, 1995; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 206, 2009; Singh *et al.*, Fl. Maharashtra State 2: 191, 2001; Almeida, Fl. Maharashtra 3A: 80, 2001.

B. spectabilis DC., Prodr. 5: 445, 1836; Hook. f., Fl. Brit. India 3: 269, 1881; Cooke, Fl. Pres. Bombay 2: 79, 1958 (Repr.).

B. spectabilis var. *longifolia* Hook. f., Fl. Brit. India 3: 269, 1881.

Leaves narrowly oblong-lanceolate, coarsely serrate-dentate. Heads 9-11 mm

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across, distinctly pedunculate in large, lax panicles; receptacle fimbriate.

Fl. & Fr.: February – April

Type: Wight s.n. (GDC)

Distribution: China, India, Taiwan, Sri Lanka and Philippines.

Note: This species has been reported on the authority of M.R.Almeida, who reports it from Purandhar and Amboli. Cooke reports it from Konkan on the authority of Stocks and Dalz.

Blumea malcolmii (Clarke) Hook. f., Fl. Brit. India 3: 266, 1881; Cooke, Fl. Pres. Bombay 2: 78, 1958 (Repr.); Randeria in *Blumea* 10: 278, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 17, 1988; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 206, 2009; Singh *et al.*, Fl. Maharashtra State 2:191, 2001.

Pluchea malcolmii C.B.Clarke, Comp. Ind. 95, 1876.

Blumea lanuginosa Law. ex Cooke, Fl. Pres. Bombay 2: 23, 1904; Almeida, Fl. Maharashtra 3A: 81, 2001. (Photo Plate 2,11)

Herbs, stout, strongly aromatic, up to 1 m high, woolly; stems many, branched from base, decumbent or ascending, densely woolly with silky white hairs. Leaves, obovate to oblanceolate, obtuse, margins irregularly spinulose-serrate, 2.5-10 x 1.5-5 cm, sessile, densely white woolly on both surfaces. Heads 1.5-2.0 cm across, terminal, clustered at the ends of branches subsessile; involucral bracts linear, acute, reflexed at maturity, densely woolly on dorsal surface; receptacle convex, alveolate, glabrous. Corolla of bisexual florets tubular, 4-5 mm long, 5-lobed; lobes and tubes pubescent; corolla of female florets filiform, 2-3 lobed, densely pubescent. Achenes dark brown, obscurely angled, sparsely pubescent. Pappus white, up to 4 mm long.

Fl. & Fr.: November – February

Type: India, Konkan, Law s.n. (K).

Distribution: Endemic to India

Occurrence & Habitat : Occasional; in hills of Konkan and crest of Ghats, growing on hillslopes.

Specimen examined : Maharashtra, Pune, Sinhagad, 12/10/55, *V.D.Vartak* 1599; Satara, Panchgani, 01/02/56, *V.D.Vartak* 3060 (AHMA); Raigad, Matheran, March 1925, *R.D.Ackland*, ACK 594; Igatpuri, 3/1/1917, *H.Santapau* 20539; Khandala, 13/5/1917, *H.Santapau* 20407; Purandar slopes, 22/12/45, *H.Santapau* 8185; Amboli, Dec. 1979, *S.M.Almeida* 44221 (BLAT); Khed, Top of Vahagaon hill, 10/12/61 *K.P.Janardharan* 76456; Radhanagri, 20/12/1958, *B.S.Ahuja* 47331; Purandar fort top, 18/02/63, *S.R.Rolla* 86529; Junnar, Dhak range, 21/01/86, *K.Hemadri* 108217 (BSI).

Exsiccata : Maharashtra, Pune, Bhimashankar, 9/12/2009, *Rajdeo Singh*, RAJ 129; Raigad, Matheran, 5/1/2011, *Rajdeo Singh*, RAJ 657; Pune, Durgawadi, 13/11/2011, *Rajdeo Singh*, RAJ 1081.

Blumea membranacea DC., Prodr. 5: 440, 1836; Hook. f., Fl. Brit. India 3: 265, 1881; Cooke, Fl. Pres. Bombay 2: 77, 1958 (Repr.); Randeria in *Blumea* 10: 269, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 17, 1988; Singh *et al.*, Fl. Maharashtra State 2: 191, 2001.

Blumea paniculata (Willd.) Almeida, Fl. Maharashtra 3A: 82, 2001.

Conyza paniculata Willd., Sp. Pl. 3: 1920, 1804.

Pluchea paniculata (Willd.) Karthik. & Moorthy, Flowering plants of India, Dicotyledons 1: 259, 2009.

B. membranacea var. *muralis* (DC.) Hook. f., op. cit.; Cooke, op. cit.

B. membranacea var. *gracilis* Hook. f., op. cit.

'Maharbir'

Key to varieties

Plants pilose and slender; involucre bracts herbaceousvar. *membranacea*

Plants robust and more or less strigose; involucre bracts rigidvar. *jaquemontii*

var. *membranacea* (Photo Plate 11)

Herbs, annual, up to 1.5 m tall; stems simple or branched from base, erect, striate, more or less glandular - pubescent. Leaves 5-13 x 2.0-4.5 cm, ovate-lanceolate or obovate, base tapering, apex acute or obtuse, margins serrate-dentate, the upper entire, the lower

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often lyrate, all hairy on both surfaces. Heads in terminal lax panicles, clustered at the ends of branches, c 0.6 cm across; involucre bracts purplish-tinged, slightly longer than florets, linear, pubescent, reflexed, inner with scarious margins; receptacle flat or slightly convex, alveolate, glabrous. Corolla of bisexual florets yellow, tubular, 4-6 mm long, 5-lobed; lobes acute, pubescent; corollas of female florets filiform, 4-5 mm long, 2-3-lobed, glabrous. Achenes brown, oblong, ribbed, pubescent. Pappus white, up to 5 mm long.

Fl. & Fr.: July – December

Type : Burma, Prome, Wallich 3019/129 (K.)

Distribution : Burma, China, India, Myanmar, Pakistan and Sri Lanka.

Occurrence & Habitat : Occasional; throughout in forests, roadsides and along streams.

Specimen examined : Maharashtra, Nashik, Trimbakeshwar, 10/11/76; *V.N.Naik* 2907; Bhokar & Hadgaon, Mahadeoghat, 08/02/80, *M.A.W.Khan* 614; Nanded, Kandhar, 27/01/84, *Madhukar* 6396 (BAMU); Pune, Khandala, St. Xavier's Ravine, 16/4/56, *H.Santapau* 20359, Mahabaleshwar, 27/12/57, *H.Santapau* 22185; Thane, Mumbra, 15/11/53, *K.V.Shenoy*, KVS 1315; Raigad, Matheran, 5/12/1954, *Z.J.Kapadia*, ZK 880; Mumbai, Borivali National Park, 3/5/1954, *A.J.Randeria*, AR 600; Mumbai, Andheri, Madh Island, 11/12/55, *G.L.Shah*, Shah 6548; Uran, 2/2/1960, *P.G.Divakar*, PD455 (BSI).

Exsiccata : Maharashtra, Raigad, Matheran, Feb. 2009, *Rajdeo Singh*, RAJ 46; Satara, Panchgani, Nov. 2009, *Rajdeo Singh*, RAJ 105; Pune, Durgawadi, 13/11/2011, *Rajdeo Singh*, RAJ 1144.

var. *jacquemontii* (Hook. f.) *Randeria* in *Blumea* 10: 271, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 17, 1988.

Blumea paniculata var. *jacquemontii* (*Randeria*) Almeida, Fl. Maharashtra 3A: 83, 2001.

Blumea jacquemontii Hook. f., Fl. Brit. India 3: 265, 1882; Bhogaonkar & Devarkar, Additions to the Fl. of Melghat 21, figs. A-F. 1999; Singh *et al.*, Fl. Maharashtra State 2: 193, 2001.

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Pluchea paniculata var. *jacquemontii* (Hook. f.) Karthik. & Moorthy, Flowering plants of India, Dicotyledons 1: 259, 2009

Plants more or less strigose and robust. Heads 7-8 mm across with rigid involucre bracts, reddish-yellow; involucre bracts 4-5-seriate, purple in colour. Achenes with a ring of minute hairs at top.

Fl. & Fr.: December – April

Type : India- Bihar state, Hooker 386 (K).

Distribution : Endemic to India

Occurrence & Habitat : Infrequent; in forests and shady localities.

Specimen examined : Nanded, Sitakhandi, 09/02/1980, M.A.W.khan 640 (BAMU).

Note : M.R.Almeida includes this variety on the authority of S.M.Almeida from Sawantwadi. Naik reports it from Nanded district.

Blumea mollis (D. Don) Merr. in Philip. J. Sci. (Bot.) 5: 395, 1910; Randeria in *Blumea* 10: 261, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 18, 1988; Singh *et al.*, Fl. Maharashtra State 2:193, 2001

Erigeron molle D. Don, Prodr. Fl. Nepal. 172, 1825.

Blumea axillaris (Lam.) DC., Prodr. 5: 434, 1836; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 204, 2009.

Conyza axillaris Lam., Encycl. 2: 84, 1786.

Blumea wightiana DC. in Wight, Contrib. Bot. Ind. 14, 1834; Hook. f., Fl. Brit. India 3: 261, 1881; Cooke, Fl. Pres. Bombay 2: 75, 1958 (Repr.).

Blumea solidaginoides (Poir) DC., Prodr. 5: 443, 1836; Almeida, Fl. Maharashtra 3A: 85, 2001.

Gnaphalium solidaginoides Poir. Encycl. Bot. Suppl. 2: 805, 1811. (Photo Plate 3)

Herbs, erect, slender, aromatic, up to 75 cm high; stems and branches terete, villous. Leaves 2.5-7.5 x 1.5-3.5 cm, ovate-oblong, ovate, densely hairy on both surfaces,

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base tapering into petiole, margins dentate-serrate. Heads 0.4-0.5 cm across, in dense, terminal, compact spiciform panicles, subsessile to distinctly pedunculate; involucre bracts herbaceous, purplish, slightly longer than the florets, linear, reflexed at maturity, densely soft villous on dorsal surface with hairs; receptacle more or less flat, alveolate, glabrous, corolla of bisexual florets purple, sometimes white at base; tubular 3-4 mm long, 5-lobed; lobes glandular pubescent; corolla of female florets 2-4 mm long, 2-4 lobed, glabrous. Achenes brown, 5-angled, oblong, pubescent. Pappus 2-4 mm long.

Fl. & Fr.: November – March

Type : Nepal, D. Don *s.n.* (BM)

Illustration : Matthew, Illus. Fl. Tamilnadu Carnatic 2: f. 357, 1982; S. Kumar in Hajra *et al.*, Fl. India 13: 136, f. 41. 1995.

Distribution : Pakistan, Nepal, India, Bhutan, Bangladesh, Myanmar, China, Sri Lanka, Africa and Australia.

Occurrence & Habitat : Common, throughout along gullies in forests, wastelands, in drying ditches, along river banks.

Specimen examined : Maharashtra, Osmanabad, Pohaner, 05/02/64, *V. N. Naik* 643, Satara, Mahabaleshwar, 13/02/72, *V.N.Naik* 1405; Nanded, Kinwat, 14/11/76, *B.R.Zate* 248; Nanded, Fugadi gudda, 08/11/79, *B.R.Zate* 1116; Mahadeoghat, 08/02/80, *M.A.W.Khan* 620; Beed, Kapildhar, 13/03/83, *S.P.Rothe* 5645; Beed, Majalgaon, 05/04/84, *S.P.Rothe* 6496 (BAMU); Mumbai, Borivali National Park, 9/1/54, *A.J.Randeria*, AR 591; Thane, Mumbra, 5/1/54, *K.V.Shenoy*, KVS 1980; Mumbai, Andheri, Madh Islands, 14/1/56, *G.L.Shah*, Shah 6685; Raigad, Matheran, 24/12/58, *N.A.Irani*, NI 2753; Uran, 17/1/1960, *P.G.Diwakar*, PD 435; Palghar, Parol, 11/1/1962, *N.Y.Das*, NYD 6640; Amboli, 29/12/1977, *S.M.Almeida* 1274 (BLAT).

Exsiccata : Maharashtra, Palghar, Vasai, 3/12/2009, *Rajdeo Singh*, RAJ 112; Pune, Bhimashankar, 12/9/2009, *Rajdeo Singh*, RAJ 134; Raigad, Matheran, 17/12/2010, *Rajdeo Singh*, RAJ 568; Aurangabad, Mahismal, 29/12/2012, *Rajdeo Singh*, RAJ 1338.

Note : Randeria (1960) in taxonomic revision of *Blumea* treated *Blumea axillaris* (Lam.) DC. in Taxa and Names of uncertain status. While Karthikeyan *et al.*, has treated *Blumea*

mollis (D. Don) Merr. as a synonym of *Blumea axillaris* (Lam.) DC.

Blumea obliqua (Linn.) Druce, Rep. Bot. Exch. Club, Brit. Is. 4:609, 1916; *Randeria* in *Blumea* 10: 286, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 18, 1988; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 206, 2009; Singh *et al.*, Fl. Maharashtra State 2: 195, 2001; Almeida, Fl. Maharashtra 3A: 81, 2001.

Erigeron obliquus Linn., Mant. Pl. 2: 574, 1771.

Blumea amplexens DC. in Wight, Contrib. Bot. Ind. 13, 1834; Hook. f., Fl. Brit. India 3: 260, 1881; Cooke, Fl. Pres. Bombay 2:75, 1958 (Repr.).

Herbs, erect, annual, aromatic, up to 50 cm high; stem terete, divaricately branched, more or less hairy. Leaves sessile, elliptic-obovate, margins serrate-dentate, base half amplexicaul to obtuse, often deeply dissected, upper oblanceolate-lanceolate, hairy on both surfaces. Heads few, solitary, terminal and axillary, on hairy peduncles, rose.pink, 0.8-1 cm across; involucre bracts linear-lanceolate, hairy on dorsal surface, reflexed at maturity, often purple tinged; receptacle slightly convex, areolate, glabrous. Corolla of bisexual florets yellow, tubular, 4-5 mm long, 5-lobed; lobes pubescent; corolla of female florets filiform, 3-4 mm long, 2-3 lobed, glabrous. Achenes dark brown, oblong, c 0.5 cm long, pubescent. Pappus yellowish-white, 3-4 mm long.

Fl. & Fr.: December – March

Type : India, Herb. Linn. No. 994.1 (LINN).

Illustration : S. Kumar in Hajra *et al.*, Fl. India 13: 138, f. 42. 1995.

Distribution : India, Sri Lanka and Myanmar.

Occurrence & Habitat : Occasional; on east of Ghats, on waste lands along roadsides and barren lands.

Specimen examined : Maharashtra, Osmanabad, Bawi, 12/02/67, V.N.Naik 1343; Aurangabad town, 14/10/76, V.N.Naik s.n.; Nanded, Kinwat, 03/02/81, B.R.Zate 1716; Parbhani, Yeldari, 25/12/83, Madhukar 5499; Ambejogai, 20/01/84, S.P.Rothe 6259 (BAMU); Junnar, Gogrewadi near Aptole, 18/01/66, K.Hemadri 108135; Thane, Bardi, 10/01/68, K.V.Billore 113416; Solapur dist., Kugaon, 04/09/2000, S.K.Das Das 182011;

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Ahmednagar, Karjat Tal., Chapadgaon, 16/12/2011, *Jayanthi & Yadav* 199320 (BSI).

Exsiccata : Maharashtra, Akola, Dec. 2013, *Rajdeo Singh*, RAJ 1426.

Blumea oxyodonta DC., Wight, Contrib. Bot. Ind. 15, 1834; Hook. f., Fl. Brit. India 3: 266, 1881; Cooke, Fl. Pres. Bombay 2: 77, 1958 (Repr.); Randeria in *Blumea* 10: 280, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 18, 1988; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 206, 2009; Singh *et al.*, Fl. Maharashtra State 2: 195, 2001; Almeida, Fl. Maharashtra 3A: 82, 2001. (Photo Plate 3,10)

Herbs, prostrate or decumbent, branched from base, up to 30 cm high; branches slender, whitish, silky hairs. Leaves often crowded at base, 1.5-8.0 x 0.6-3.5 cm, glandular hairy on both sides, apex spinulose-acute or apiculate, margins spinulose serrate-dentate; lower ones obovate to obovate-oblong, narrowed into a small petiole; upper elliptic or narrowly obovate, rounded or slightly tapering at base. Heads 0.6 cm across, in terminal and axillary compact or lax, few flowered corymbose panicles, subsessile or pedunculate; involucre bracts linear, acute, scarious margins, reflexed at maturity, densely villous and glandular on dorsal surface; receptacle flat or slightly convex, alveolate, glabrous. Corolla of central florets yellow, tubular, 3-4 mm long, 5-lobed; lobes pubescent; corolla of female florets 3-4 mm long, 2-3 lobed; lobes pubescent. Achenes oblong, not ribbed, pubescent. Pappus white, 3-4 mm long, deciduous.

Fl. & Fr.: November – June

Type : India, Negapatam, Wight 1436 (K)

Illustration : S. Kumar in Hajra *et al.*, Fl. India 13: 140, f. 42. 1995.

Distribution : India, Nepal, Pakistan, Myanmar, China, Bhutan and Vietnam.

Occurrence & Habitat : Common; throughout on rocky soil along roadsides, wastelands and around fields.

Specimen examined : Maharashtra, Pune, Katraj, 13/02/ 58, *V.D. Vartak* 12646 (AHMA);

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Osmanabad, Papnas, 27/01/63, *V.N.Naik* 559; Satara, Mahabaleshwar, 12/02/72, *V.N.Naik* 1401; Nanded, Mahur, 05/01/1970, *V.N.Naik* 459; Beed, Sautada, 12/03/83, *S.P.Rothe* 5629; Jalna, 25/12/77, *V.N.Pardeshi* 3214; Nanded, Kinwat, 03/02/81, *B.R.Zate* 1731 (BAMU); Mumbai, Borivali National Park, 15/3/1952, *A.J.Randeria*, AR233; Pune, Khandala, St. Xavier's Ravine, 6/1/57, *G.L.Shah* 20396; Raigad, Matheran to Water pipe line, 6/12/1958, *N.A.Irani*, NI 2613; Palghar, Parol, Tungar, 11/1/1962, *N.Y.Das*, NYD 6665; Uran, Karanja, 14/12/1959, *P.G.Diwakar*, PD280; Sindhudurg, Amboli, 29/12/1977, *S.M.Almeida* 1265 (BLAT); Pune, Junnar, Shivneri hill, 15/01/66, *K.Hemadri* 108108; Ahmednagar, Karjat Tal., Deolgaon, 17/12/11, *Jayanthi & Yadav* 199335 (BSI).

Exsiccata : Maharashtra, Raigad, Matheran, Feb. 2009, *Rajdeo Singh*, RAJ 48; Palghar, Wada, 21/12/2010, *Rajdeo Singh*, RAJ 617; Mumbai, Gorai, 23/10/2009, *Rajdeo Singh*, RAJ 62; Raigad, Pali, 13/2/2011, *Rajdeo Singh*, RAJ 857.

Blumea riparia (Bl.) DC., Prodr. 5:444, 1836; Randeria in *Blumea* 10: 213, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 18, 1988; Naik & Bhogaonkar in *J. Econ. Tax. Bot.* 14: 733, 1990; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 206, 2009; Singh *et al.*, Fl. Maharashtra State 2:195, 2001.

Conyza riparia Bl., Bijdr. 899, 1826 (non H. B. & K).

Blumea chinensis DC., Prodr. 5: 444, 1836 p.p. non *Conyza chiensis* L.; Hook. f., Fl. Brit. India 3: 268, 1881.

Herbs upto 2 m tall; stems and branches glandular, woody at base, terete, glabrate or sparsely puberulous in young parts. Leaves obovate-oblong to elliptic-ovate, acute or obtuse, base rounded, margins mucronulate-denticulate, both surfaces glabrous or sparsely hairy. Heads 8-13 mm across, in terminal or axillary, lax panicle racemes, yellow; involucre bracts almost equal to florets; outer ones distinctly oblong-ovate, hairy on the back; inner ones linear-oblong, scarious, sparsely hairy; receptacle flat, 2-5 mm across, densely hairy. Corolla of bisexual florets yellow, tubular, 5-6 mm long, 5-lobed, pubescent; corolla of female florets filiform, 4-5 mm long, 2-4 lobed, occasionally pubescent on lobes. Achenes pale brown, oblong, ribbed, pubescent, more or less 4-angled. Pappus white, 4-6 mm long.

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Fl. & Fr.: November – February

Type : Java, Blume *s.n.* (L)

Distribution : India, Myanmar, China, Philippines, Indonesia and New Guinea

Occurrence & Habitat : Occasional; along forest margins amidst-bushes.

Specimen examined : Maharashtra, Amravati dist., Manjarkhed, ?, *P.Y. Bhogaonkar*, PYB 11(d).

Note : This species has been reported here on the authority of Naik & Bhogaonkar from Amravati.

Blumea sessiliflora Decne., Nouv. Ann. Mus. Rar. 3: 140, 1834; Randeria in *Blumea* 10: 257, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 19, 1988; Naik & Bhogaonkar in *J. Econ. Tax. Bot.* 14: 733, 1990; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 207, 2009; Singh *et al.*, Fl. Maharashtra State 2:196, 2001; Almeida, Fl. Maharashtra 3A: 84, 2001.

Herbs, erect, pubescent, up to 1 m high; stem simple or branched, glabrate at the base, tomentose in upper parts. Leaves sessile, obovate to oblanceolate, base tapering; lower leaves usually lyrate, pinnatifid; upper leaves entire, serrate-dentate, 5-15 x 1.5-6 cm, velutinous-pilose on both surfaces. Heads yellow, in clusters of 3-5, in spiciform panicles, 5-6 mm across, sessile or pedunculate; involucre bracts slightly longer than florets, herbaceous, densely pilose on dorsal surface, margins scarious; receptacle slightly convex, alveolate, glabrous. Corolla of bisexual florets yellow, tubular, filiform, 3 - 4 mm long, 5-lobed; lobes pubescent; corolla of female florets filiform, 3-4 mm long, 2-3 lobed, glabrous. Achenes brown, oblong, ribbed, pilose. Pappus white, 3-4 mm long.

Fl. & Fr.: December – February

Type : Timor, Decaisne *s.n.* (P)

Distribution : India, Myanmar, China and S.E. Asia.

Occurrence & Habitat : Rare; in forest undergrowth.

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Specimen examined : Maharashtra, Amravati dist., Dhargad, ?, P.Y.Bhogaonkar, PYB 32(b).

Note : This species has been reported on the authority of Naik & Bhogaonkar from Amravati.

Blumea venkataramanii Rolla Rao & Hemadri, *Curr. Sci.* 42(19): 693, 1973; Rao *et al.*, *Fl. Ind. Enum. Aster.* 19, 1988; Karthikeyan *et al.*, *Flowering plants of India, Dicotyledons* 1: 207, 2009; Singh *et al.*, *Fl. Maharashtra State* 2: 196, 2001; Almeida, *Fl. Maharashtra* 3A: 85, 2001.

Herbs, erect, annual, aromatic, 1 m high; stems terete, striate, clothed with simple or glandular hairs. Lower leaves spatulate, elliptic-obovate or oblanceolate, narrowed at base, margin irregularly dentate or serrate, hairy on both surfaces, base decurrent forming a false prominently winged stem; upper most leaves smaller, oblong-lanceolate or spatulate with decurrent base. Heads terminal and lateral, yellow, solitary or in clusters, pedunculate; involucre bracts 3-4-seriate; outer 2 whorls green, 2-4 mm long; inner ones tinged with purple at apex, all linear, scarious, 4-6 mm long, outer surface glandular hairy; receptacle hemispheric, glabrous. Outer florets female, in 5 rows; corolla yellow, 3 mm long, lobes 3, minutely glandular along margins; inner florets bisexual; corolla yellow, 4 mm long, lobes 5, glandular hairy or glabrous. Achenes minute, 1 mm long, subcylindrical or 4 angled, sparsely hairy. Pappus as long as corolla, white.

Fl. & Fr.: December – February

Type : India, Poona, Vadgaon, Hemadri, K. 118174A (Holotype CAL)

Distribution : Endemic to India, Maharashtra.

Occurrence & Habitat : Rare; in Pune, near cultivated fields & open places.

Specimen examined : Maharashtra, Pune-Bombay road, near Vadgaon, 12/12/1968, K.Hemadri, 118174 B & C.

Exsiccata : Maharashtra, Pune, Durgawadi, 13/11/2011, Rajdeo Singh, RAJ 1107, 1108.

Blumea virens DC. in Wight, Contrib. Bot. Ind. 14, 1834; Hook. f., Fl. Brit. India 3: 264, 1881; Cooke, Fl. Pres. Bombay 2: 77, 1958 (Repr.); Randeria in *Blumea* 10: 272, 1960; Rao *et al.*, Fl. Ind. Enum. Aster. 19, 1988; Singh *et al.*, Fl. Maharashtra State 2: 196, 2001. *Blumea laevis* (Lour.) Merrill, Trans. Phil. Soc. 24: 386, 1935; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 205, 2009; Almeida, Fl. Maharashtra 3A: 80, 2001.

Placus laevis Lour., Fl. Cochinch. 497, 1790.

Herbs, erect, annual, up to 1 m high; stems striate, simple or branched, glabrous. Leaves variable, 2-10 x 1-4.5 cm, lower ones oblanceolate, lyrate lobed, petioled; upper ones obovate to oblanceolate, irregularly sinuate toothed, all glabrous above, sparsely glandular-hairy beneath. Heads 0.5-0.7 cm across, in lax, terminal leafy panicles; involucre bracts linear, mucronate, herbaceous, reflexed at maturity, sparsely pilose on dorsal surface; inner bracts with scarious margins; receptacle convex, alveolate, glabrous. Corolla of bisexual florets yellow, tubular, 4-5 mm long, 5-lobed; lobes pubescent, glandular; corolla of female florets filiform, 4-5 mm long, 2-3 lobed, glabrous. Achenes oblong, 8-10-ribbed, sparsely hairy. Pappus white, up to 4 mm long.

Fl. & Fr.: December – May

Type : India, Negapatam, Wight 1430 (E).

Illustration : S. Kumar in Hajra *et al.*, Fl. India 13: 144, f. 44. 1995

Distribution : Bhutan, India, Myanmar, Pakistan, China and Philippines.

Occurrence & Habitat : Occasional; on hills in konkan, crest of Ghats and eastwards, in dry places and deciduous forests.

Specimen examined : Maharashtra, Pune, Rajgad, 19/02/55, V.D.Vartak 441; Satara, Mahabaleshwar, 29/01/56, V.D.Vartak 2912 (AHMA); Sindhudurg, Amboli, 26/5/77, S.M.Almeida 224; Thane, Mumbra, 23/12/1953, K.V.Shenoy, KVS 1780 (BLAT); Ratnagiri, Ramghat, 07/02/70, B.G.Kulkarni, 119288; Amravati, Makhla forest, 25/06/77, M.Y.Ansari 147177; Akola, Narnala fort, 24/06/78, S.Y.Kamble 153809 (BSI).

Exsiccata : Maharashtra, Amravati, Melghat, 21/1/2010, Rajdeo Singh, RAJ 172; Yavatmal, Painganga, 27/1/2011, Rajdeo Singh, RAJ 778; Raigad, Pali, 13/2/2011,

Rajdeo Singh, RAJ 850.

Note : *Randeria* includes *Blumea laevis* (Lour.) Merrill in Taxa and Names of uncertain status, while Karthikeyan *et al.*, and M.R. Almeida has treated *Blumea virens* DC. as a synonym of *Blumea laevis* (Lour.) Merrill.

Caesulia Roxb., Pl. Coromandel 1: 64, 1798.

Type: *Caesulia axillaris* Roxb.

Herbs, annual. Leaves alternate, lanceolate, serrulate. Heads homogamous, in sessile, axillary, involucre clusters. All florets bisexual, fertile; involucre bracts 2, large, membranous, opposite, keeled or winged at length; receptacle with lanceolate, stramineous paleae. Corolla tubular, deeply 5-lobed; lobes linear. Anther base sagittate; tails with bundle of fine hairs. Style arms short, linear-cuneate. Achenes included in the laterally compressed bracts, obovoid, winged on each side, sparsely hairy. Pappus of 2, ovate scales above the wings.

A monotypic genus of the Indian subcontinent.

Caesulia axillaris Roxb., Pl. Corom. 1: 64, t. 93. 1798; Hook. f., Fl. Brit. India 3: 291, 1881; Cooke, Fl. Pres. Bombay 2: 92, 1958 (Repr.); Rao *et al.*, Fl. Ind. Enum. Aster. 20, 1988; S. Kumar & P.C. Pant in Hajra *et al.*, Fl. India 13: 2, f. 1. 1995; Karthikeyan *et al.*, Flowering plants of India, Dicotyledons 1: 208, 2009; Singh *et al.*, Fl. Maharashtra State 2: 197, 2001; Almeida, Fl. Maharashtra 3A: 86, 2001. (Photo Plate 3)

Herbs, prostrate or suberect, succulent, up to 45 cm tall; stem stout, more or less branched, striate, glabrous. Leaves alternate, lanceolate, distantly serrulate, acute, narrowed at base, glabrous, sessile, stem clasping. Heads axillary, sessile, ca 1.3 cm across; involucre bracts 2, membranous, orbicular or broadly ovate, crenate or dentate; receptacle glabrous, sparsely paleaceous. Florets all fertile, bisexual, pale blue or white; outer florets intermixed with linear, acute paleae; inner without paleae; corolla tubular, ca 2 mm long, 5-lobed. Anthers black; bases sagittate; tails slender, consisting of small bundle of fine hairs. Achenes obovoid, 2-3 X 1 mm, flat, winged, sparsely hairy. Pappus of 2, ovate scales, ribbed on the back.

Fl. & Fr.: August – May